MEMS ELEMENT HAVING PERPENDICULAR PORTION FORMED FROM SUBSTRATE

ABSTRACT OF THE DISCLOSURE

A microelectromechanical systems (MEMS) element, MEMS optical switch and MEMS fabrication method are described. The MEMS element comprises a crystalline and moveable element is moveably attached to the substrate. The moveable element includes a perpendicular portion oriented substantially perpendicular to a plane of the substrate. The crystal structure of the perpendicular portion and substrate are substantially similar. The moveable element moveable is moveably attached to the substrate for motion substantially constrained to a plane oriented substantially perpendicular to a plane of the substrate. In at least one position, a part of a perpendicular portion of the moveable element projects beyond a surface of the substrate. The moveable element may be retained in place by a latch. The perpendicular portion may be formed substantially perpendicular portion to the substrate. An array of such structures can be implemented to work as an optical switch. The optical switch may comprise a crystalline substrate and one or more moveable elements moveably attached to the substrate The MEMS elements may be fabricated by providing a substrate; forming one or more trenches in the substrate to define a perpendicular portion of a element; and moveably attaching the moveable element to a first surface of the substrate; removing a portion of the substrate such that at least a part of the perpendicular portion projects beyond a second surface of the substrate. The various embodiments provide for a robust and reliable MEMS elements that may be simply fabricated and densely packed.